WHAT IS CLAIMED IS:

1. A method to manufacture composite polymer electrolyte membranes coated with inorganic thin films for fuel cells, characterized to obtain composite membranes by coating the surface of polymer electrolyte membranes with inorganic thin films using a plasma enhanced chemical vapor deposition method or a reactive sputtering method.

2. The method according to claim 1, wherein the inorganic materials of said inorganic thin film are chosen one or more from the group comprising silicon oxide (SiO_2), titanium oxide(TiO_2), zirconium oxide (ZrO_2), zirconium phosphate ($Zr(HPO_4)_2$), zeolite, silicalite, and aluminum oxide (Al_2O_3).

3. The method according to claim 1, wherein said polymer electrolyte membranes are; perfluorosulfonic acid membranes such as Nafion® membrane, Dow membrane, Flemion membrane, Aciplex membrane, BAM, or Gore-select membrane; electrolyte membranes made of proton conducting hydrocarbon materials such as sulfonic polysulfonide, sulfonic polyethylene, sulfonic polypropylene, sulfonic polystyrene, sulfonic polyphenol formaldehyde, polystyrene divinylbenzene sulfonic acid, sulfonic polybenzyimidasol, sulfonic polyamide, or sulfonic polyether-ether ketone; or electrolyte membranes made of proton conducting fluorine materials

such as sulfonic polyvinylidene fluoride, sulfonic polytetrafluorethylene, or fluoric ethylene propylene.

4. The method according to claim 1, wherein said PECVD method uses reactants being one or more monomers chosen from the group of organic metal compounds containing aluminum, titanium, silicon, and zirconium in conjunction with one or more gases out of the group of oxygen, nitrogen, hydrogen, steam, and argon.

5. The method according to claim 1, wherein said organic metal compounds are one or more chosen from the group comprising trimethyl disiloxanes (TMDSO), hexamethyl disiloxane (HMDSO), hexamethyl disilane, tetraethyl orthosilicate (TEOS), tetramethyl orthosilicate, tetrabuthyl orthosilicate, tetra-isopropyl orthosilicate, aluminium methoxide, aluminium ethoxide, aluminium butoxide, aluminium isopropoxide, titanium ethoxide, titanium methoxide, titanium butoxide, titanium isopropoxide, zirconium ethoxide, and zirconium butoxide.

6. The method according to claim 2, wherein said organic metal compounds are one or more chosen from the group comprising trimethyl disiloxanes (TMDSO), hexamethyl disiloxane (HMDSO), hexamethyl disilane, tetraethyl orthosilicate (TEOS), tetramethyl orthosilicate, tetrabuthyl orthosilicate, tetra-

isopropyl orthosilicate, aluminium methoxide, aluminium ethoxide, aluminium butoxide, aluminium isopropoxide, titanium ethoxide, titanium methoxide, titanium butoxide, titanium isopropoxide, zirconium ethoxide, and zirconium butoxide.

7. The method according to claim 1, wherein said reactive sputtering process is characterized to use a 99 % or higher pure metal target such as Si, SiO_2, SiNH, Al, Zr, or Ti, and to maintain its initial pressure at a high vacuum range of 1.0 10^{-3} torr to 1.0 10^{-6} torr.

8. The method according to claim 1, wherein said PECVD method or reactive sputtering method is characterized to have a microwave power at the range of 10 watts to 500 watts.

9. The method according to claim 1, wherein the reaction chamber pressure of said PECVD method or reactive sputtering method is in the range of 1.0 to 1000 millitorr.

10. The method according to claim 1, wherein the argon pre-treatment electromagnetic wave power of said PECVD method or reactive sputtering method is in the range of 10 watts to 500 watts.

11. The method according to claim 1 or 10, wherein the argon pre-treatment pressure of said PECVD method is in the range of 1.0 to 500 millitorr.

12. The method according to claim 1, wherein the reaction gas pressure in the chamber of said PECVD process is in the range of 10 to 500 millitorr.

13. The method according to claim 1, wherein the thickness of said inorganic films is in the range of 1.0 to 500 nm.

14. The method according to claim 1, wherein said manufacturing method further comprises a step of coating the surface of electrolyte membrane with a proton-conducting ionomer solution, after coating said inorganic film on the said membrane surface, so as to enhance contact with the electrodes during manufacturing membrane-electrode assembly.

15. A composite polymer electrolyte membrane coated with inorganic thin films for fuel cells manufactured according to claims 1.

16. An MEA employing the composite polymer electrolyte membranes coated with inorganic thin films manufactured according to claim 1.

17. A method of manufacturing an MEA including a process of coating catalysts for electrodes directly on the composite polymer electrolyte membranes coated with inorganic thin films manufactured according to claim 1.

18. A fuel cell employing the composite polymer electrolyte membranes coated with inorganic thin films or the MEA containing the said composite membrane manufactured according to claim 1.